Meeting of the Central Valley Flood Protection Board
October 28, 2010

Staff Report

Friends of the Tuolumne, Inc.
Bobcat Flat Restoration Project, Stanislaus County

1.0 – ITEM

Consider approval of Permit No. 18601 (Attachment B)

2.0 – APPLICANT

Friends of the Tuolumne, Inc.

3.0 – LOCATION

The project is located approximately 10 miles east of Waterford, along the Tuolumne River. (Tuolumne River, Stanislaus County, see Attachment A)

4.0 – DESCRIPTION

The applicant proposes to place approximately 16,000 cubic yards of coarse sediment along approximately 1,800 linear feet, and excavate approximately 41,000 cubic yards; place approximately 2,500 cubic yards of coarse sediment to be added along approximately 1,500 linear feet of Duck Slough; and plant approximately 1,100 tree cuttings and 1,100 herbaceous species of vegetation, within 334-acres of the Designated Floodway of the Tuolumne River (Bobcat Flat).

5.0 – PROJECT ANALYSIS

Project activities include extracting cobbles and coarse gravels, coarse sediment introduction, slough and riparian restoration along the north bank of the Tuolumne River. The project footprint, located on the north bank, includes approximately 11+ acres where 36,500± yd^3 will be excavated from the degraded floodplain at five existing borrow sites and two areas, totaling 1.8 acres, will be used to store screened, sorted, and cleaned cobble and gravel. Within this reach, up to 16,000 yd^3 of cobbles and

coarse gravels would be introduced into nine - fourteen "patches", helping to restore a natural pool-riffle morphology in the river channel. At the downstream end of the work area, work will be done to reconnect and improve habitat conditions in a remnant dredger swale (i.e. Duck Slough) and fill-in two remnant off-channel mining pits. This work includes the excavation of 4,500 yd^3 to reconnect the slough and partially fill Duck Slough with 2500± yd^3 to create a shallower side channel and the remaining material filling in the two mining pits to address potential stranding and adverse conditions for salmonids during moderate flow events. (See Attachment F for Overall Plan and Profiles)

The design also proposes to plant approximately 1,100 trees and 1,100 herbaceous species plants as described below and in greater detail in the Approved Planting Plan, attached as Exhibit A to Permit No. 18601.

The re-vegetation plan will plant native plant species on the newly lowered surfaces in accordance to Title 23. The site is divided into three revegetation types; 1) Mixed willow and cottonwood planting, 2) un-planted natural recruitment areas, and 3) Nursery stock planting areas.

1) Mixed willow and cottonwood patches: Native mixed willow and cottonwood cuttings will be planted in areas excavated to a design floodplain elevation. These areas are designed to be within 4 feet of summer ground water to insure that cuttings can be placed directly into water. Cuttings will be placed in rows 20 feet apart and parallel to overbank flow. Cuttings within the rows will be spaced at least 15 feet on center. Up to 1,100 cuttings will be placed in this manner.

2) Un-planted natural recruitment areas are designated to provide control data of what natural recruitment takes place when remnant scraped dredger surface is lowered to an elevation that begins to inundate around the 1.5- to 2-year flood event; a natural floodplain elevation.

3) Nursery stock planting areas: One of the byproducts of coarse sediment sieving is the production of fine sediment (coarse sediment less than 1/8 inch). These fines will be spread on constructed floodplain surfaces that are depositional and less likely to see high velocities and shear stress that would wash them back into the main channel. Placed fines provide the planting medium necessary for nursery stock plants for establishment and growth. Without fines, nursery stock planting areas would remain too rocky for successful growth.

5.1 – Project Background

The project site has been severely damaged and the fish and wildlife habitat left significantly altered for many years. This reach of the Tuolumne River was altered by gold dredging activities done to excavate the original river channel and flood plain up to 25 feet deep during the first half of the last century. This reach of the river was further altered during the 1960s by harvesting gravels during construction of upstream dams and by upstream dam construction (especially the New Don Pedro Dam in 1971) that has changed the flow regime of the river and reduced coarse gravel recruitment in this reach of the river. These river altering activities converted this reach of the Tuolumne River channel from a natural river pool-riffle sequence, which had provided spawning and rearing habitat for Chinook salmon and steelhead, to a lake-cascade stream morphology, with steep gravel gradients and long pools in between gravel bars, and with swift water unsuited to spawning and rearing habitat for salmon and steelhead. The Tuolumne River historically served as spawning and rearing habitat for large populations of Chinook salmon and steelhead. The Chinook salmon and steelhead populations have declined significantly over the past several decades throughout their range. Central Valley Steelhead is listed as Threatened pursuant to the Federal Endangered Species Act (FESA). Fall-run Chinook salmon are also California Species of Special Concern.

The proposed restoration and enhancement of spawning and rearing habitat in the Tuolumne River for these fish species is needed for their continued survival and recovery from the current threat of decline and ultimate extinction. Since the construction of upstream dams created a barrier to prevent the Chinook salmon and steelhead from migrating upstream of the dams for spawning above La Grange, there is no feasible alternative to the reconstruction and enhancement of spawning and rearing habitat within the main channel of the Tuolumne River. This reach of the river has not been able to recover natural channel and floodplain features and habitats. If the project is not constructed with mechanical intervention, the Chinook salmon and the steelhead will likely continue to lose population numbers. The proposed restoration and enhancement of salmonid habitat will also benefit other aquatic and terrestrial animals in and around the Tuolumne River. The proposed reconstruction and enhancement of Duck Slough and the Tuolumne River are also needed to meet the recreational needs of Central Valley fishermen and the livelihood of California’s commercial fishermen.

5.2 – Project Design Review

Board staff has reviewed the following documents, provided by the applicant, in preparation of this staff report:

- Bobcat Flat Phase II Restoration Design Plans
- Planting Plan (Exhibit A to Permit No. 18601)
- Hydraulic Analysis Technical Memorandum

5.3 – Hydraulic Analysis

The proposed project was analyzed using the one-dimensional HEC-RAS model. A 100-year event was used for analysis, which represented a flow of 42,000-cfs. The analysis utilized composite Manning's roughness coefficients of 0.035 for existing in-channel values. For overbank surfaces roughness coefficients ranging from 0.05 to 0.06 were used to represent the existing and proposed side channel, floodplain, channel margins, and vegetated tailings. Roughness coefficients for the proposed (full-maturity) were set to a conservative 0.1 to allow for the natural recruitment of desired riparian habitat. In a very conservative case, the hydraulic model actually reflects blocked areas of flow where rigid trees are located.

Hydraulic impacts for the project, as designed, are minimal. There is an overall change in water surface elevation (WSE) from -0.05 to +0.01-feet for the proposed (full-maturity and grow-out) condition and for the conservative analysis using blocked areas of flows (described above) WSE varied from -0.05 to +0.09-feet. The velocity changes varied from -0.46 to 0.15-feet/second for the proposed condition and from -0.46 to 0.53-feet/second throughout the project. There are negligible impacts on the both the upstream and downstream ends of the project, therefore influence and cumulative effects should also be negligible for the system.

The floodway, in the area of the project, is very wide and ranges from 1,000 to 3,000-feet and due to the design of the project, staff has concluded that the project has minimal impacts on the floodway with the environmental needs being met in a balanced fashion. For these reasons, along with the use of conservative analysis, staff also agrees with the applicant's use of no Long-Term Management Plan (LTMP) for this specific case, as there will be considerable monitoring used to keep an advantageous habitat for the salmonid population and because of the above conclusion that hydraulic impacts to the floodway are minimal. See Attachment E for Hydraulic Profile and Tabular Data information.

5.4 – Geotechnical Analysis

Upon completion of staff review of the design plans, staff is in agreement with the applicant's conclusion that this project does not bear any significant geotechnical impacts on the designated floodway and all work to be completed will be done in a manner that does not pose a threat to the structural integrity of the channel or floodway. All earthwork shall be completed in compliance with Permit No. 18601 (Attachment B) and Title 23 Standards.

5.5 – Project Benefits

The project has the following benefits associated with its completion:

- Balance sediment supply and transport capacity to allow the accumulation and retention of salmonid spawning gravel;
- Restore floodplain functions that foster recruitment of riparian vegetation and the quality of riparian habitat;
- Increase in-channel habitat complexity to improve aquatic habitat for native aquatic species; and
- Re-engineer the low-flow and bank-full channel geometry so that it is scaled to function properly under current (regulated) flow conditions and to restore habitat connectivity for this reach of the Tuolumne River.

5.6 – Additional Staff Analysis

This project does not have a LTMP, for the reasons described above in Section 5.3, and Board staff is in agreement with the applicant's assessment that the project does not require a LTMP since the hydraulics assumed full riparian recruitment with minimal impacts.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- A U.S. Army Corps of Engineers (Corps) Non-Fed letter was received August 16, 2010 (Attachment D) stating that the project does not affect a federally

constructed project and that they have no comments about the project at this time.

7.0 – PROPOSED CEQA FINDINGS

Board staff has prepared the following CEQA Findings:

The Board, as a responsible agency under CEQA, has reviewed the Initial Study/Mitigated Negative Declaration (IS/MND) (SCH Number: 2010072048, July 2010) and Mitigation Monitoring Plan for the Bobcat Flat West Restoration Phase II, River Mile 43 Project prepared by the lead agency, the California Department of Fish and Game. These documents may be viewed or downloaded from the Central Valley Flood Protection Board website at http://www.cvfpb.ca.gov/meetings/2010/10-28-29-2010agenda.cfm under a link for this agenda item.

The California Department of Fish and Game determined that the Bobcat Flat West Restoration Phase II, River Mile 43 Project would not have a significant effect on the environment and filed a Notice of Determination on August 30, 2010 with the State Clearinghouse. Board staff finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's Mitigation Reporting Plan and address impacts to air, biological resources, cultural resources, geology and soil resources and hydrology.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

   The Board has considered all the evidence presented in this matter, including the original and updated applications, past and present Staff Reports and attachments. The Board has also considered all letters and other correspondence received by the Board and in the Board's files related to this matter.

The custodian of the file is Executive Officer Jay Punia at the Central Valley Flood Protection Board.

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

   The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

3. Effects of the decision on the entire State Plan of Flood Control:

   This project does not have significant impacts on the State Plan of Flood Control, as the project does not impair the structural or hydraulic functions of the system.

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

   There are no other foreseeable projected future events that would impact this project.

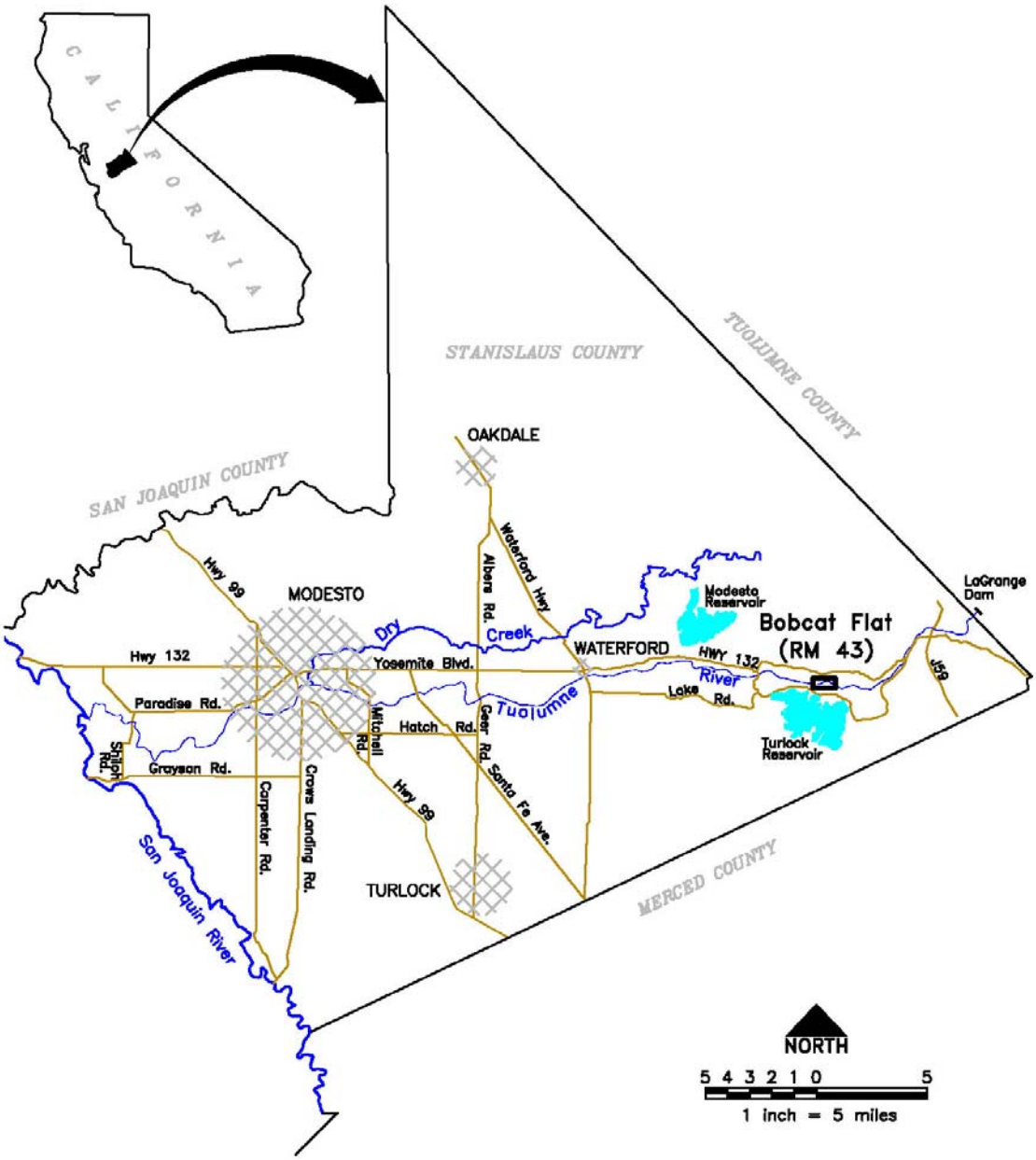
9.0 – STAFF RECOMMENDATION

Staff recommends that the Board adopt Resolution No. 10-47 (Attachment C) which constitutes the Boards written findings and decision in the matter of Permit No. 18601 (Attachment B). The Resolution contains the Boards CEQA findings; Findings of Fact; and approval of Permit No. 18601 to; and an order to direct the Executive Officer to take necessary actions to prepare and execute the permit and related documents and to prepare and file a Notice of Determination with the State Clearinghouse.

10.0 – LIST OF ATTACHMENTS

A. Location Maps and Photos
B. Draft Permit No. 18601
   Exhibit A: Approved Planting Plans
C. Resolution No. 10-47
D. Corps Non-Fed letter
E. Hydraulic Profiles and Tabular Data
F. Overall Plan and Profiles

Design Review:	Nancy C. Moricz, P.E.
Environmental Review:	Andrea Mauro, E.S.
	James Herota, E.S.
Document Review:	David R. Williams, P.E. – Senior Engineer
	Len Marino, P.E. – Chief Engineer


CALIFORNIA
STANISLAUS COUNTY
TUOLUMNE COUNTY
SAN JOAQUIN COUNTY
MERCED COUNTY
OAKDALE
MODESTO
WATERFORD
TURLOCK
Hwy 99
Hwy 132
Yosemite Blvd.
Paradise Rd.
Grayson Rd.
Hatch Rd.
Albers Rd.
Waterford Hwy
Mitchell Rd.
Geer Rd.
Santa Fe Ave.
Crows Landing Rd.
Carpenter Rd.
Shiloh Rd.
Dry Creek
Tuolumne River
San Joaquin River
Modesto Reservoir
Bobcat Flat
(RM 43)
Lake Rd.
Turlock Reservoir
LaGrange Dam
J59
NORTH
5 4 3 2 1 0 5
1 inch = 5 miles

Aerial view of the west part of Bobcat Flat during high flows in April 2006.

Drift boat moving downstream in a new channel created by 2005 floodplain lowering; September 2006.

Willow saplings growing in an area where gravels were harvested in 2005, looking south; 09/04/09.

One patch of dredger tailings where gravels will be harvested in 2010, looking west; 09/04/09.

Area in the northwest part of the site where the floodplain will be lowered, looking north; 09/04/09.

Area in the southwest part of the site where the floodplain will be lowered, looking northwest; 09/04/09.

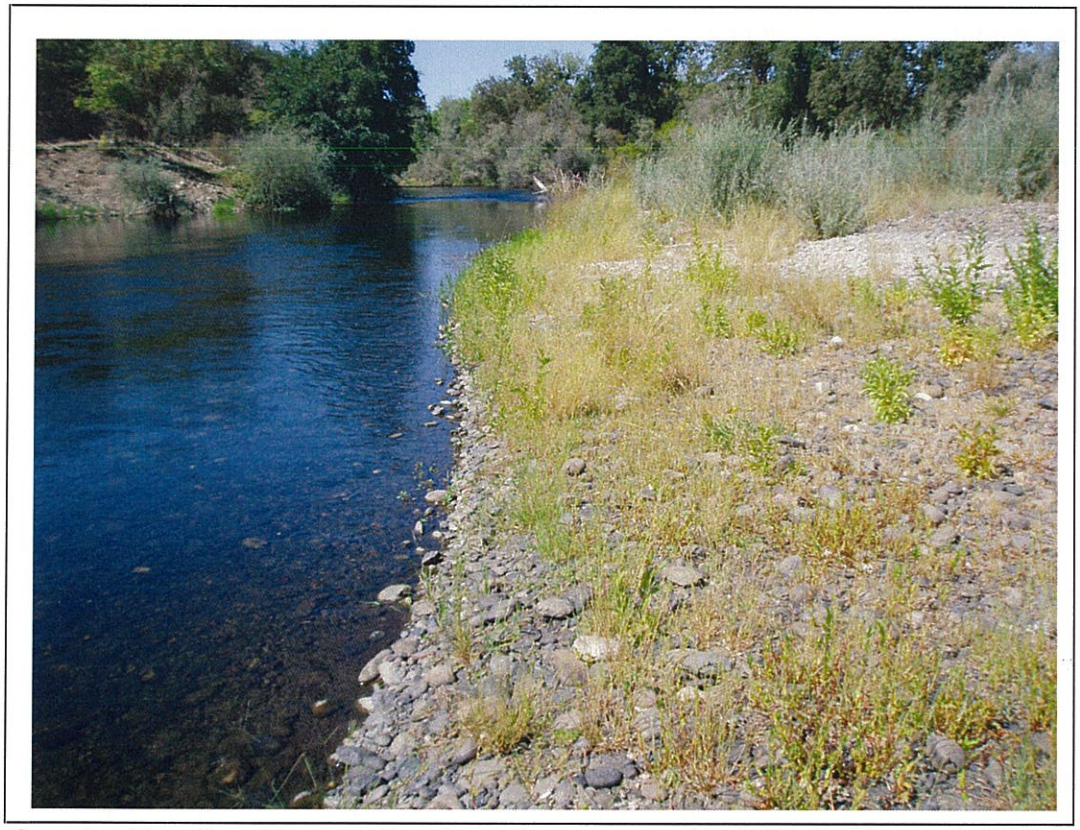
North water hyacinth-choked pond that will be filled to become shallower, looking south; 09/04/09.

South water hyacinth-choked pond that will be filled to become shallower, looking south; 09/04/09.

Patches 7A and 7B, where new gravel will fill an instream pocket and narrow the channel; 09/04/09.

Patch 8, where new gravel will fill an instream pocket and narrow the channel; 09/04/09.

Gravel patches 5 and 6, where the channel was narrowed in 2005, looking southeast; 09/04/09.



Gravel patches 5 and 6, where the channel was narrowed in 2005, looking west; 09/04/09.

Patches 13 and 14, where gravel bars will narrow the channel and increase water velocity; 09/04/09.

Water hyacinth-choked "Duck Slough", which will filled to become shallower, looking west; 09/04/09.

DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18601 BD

This Permit is issued to:

Friends of the Tuolumne, Inc.
1900 NE 3rd Street, Suite 106#314
Bend, Oregon 97701

To place approximately 16,000 cubic yards of coarse sediment along approximately 1,800 linear feet, and excavate approximately 41,000 cubic yards; place approximately 2,500 cubic yards of coarse sediment to be added along approximately 1,500 linear feet of Duck Slough; and plant approximately 1,100 tree cuttings and 1,100 herbaceous species of vegetation, within 334-acres of the Designated Floodway of the Tuolumne River (Bobcat Flat). The project is located approximately 10 miles east of Waterford in Stanislaus County (Section 32, T3S, R13E, MDB&M, Tuolumne River, Stanislaus County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

_____
Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to

change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18601 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: Prior to commencement of work, the permittee shall create a photo record, including associated descriptions, native plant species counts, and floodway conditions. The photo record shall be certified (signed and stamped) by a licensed land surveyor or professional engineer registered in the State of California and submitted to the Central Valley Flood Protection Board within 30 days of beginning the project.

FIFTEEN: The mitigation measures approved by the CEQA lead agency and the permittee are found in its Mitigation and Monitoring Reporting Program (MMRP) adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

SIXTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SEVENTEEN: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood

Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion

EIGHTEEN: The Central Valley Flood Protection Board and the Department of Water Resources shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

NINETEEN: The permittee shall be responsible for repair of any damages to the floodway and other flood control facilities due to construction, operation, or maintenance of the proposed project.

TWENTY: No construction work of any kind shall be done during the flood season from November 1 to July 15 without prior approval of the Central Valley Flood Protection Board.

TWENTY-ONE: The permittee shall provide supervision and inspection services acceptable to the Central Valley Flood Protection Board.

TWENTY-TWO: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-THREE: Fill material shall be placed only within the area indicated on the submitted drawings.

TWENTY-FOUR: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-FIVE: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the floodway.

TWENTY-SIX: To ensure the protection of valuable riparian habitat, no native trees, shrubs, or other woody vegetation greater than 16 inches in diameter at the base shall be removed or disturbed.

TWENTY-SEVEN: Proposed vegetative rows shall be parallel to the direction of the overbank flow and shall not direct the flows toward any levee, and shall be constructed in accordance with the Approved Planting Plan, which is attached to this permit as Exhibit A and incorporated by reference.

TWENTY-EIGHT: The ground surface shall be kept clear of fallen trees, branches, and debris.

TWENTY-NINE: The Central Valley Flood Protection Board may require clearing and/or pruning of trees planted within the floodway in order to minimize obstruction to floodflows.

THIRTY: Cleared trees and brush (or prunings therefrom) shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to July 15.

THIRTY-ONE: After each period of high water, debris that accumulates at the site shall be completely

removed from the floodway.

THIRTY-TWO: Areas where plantings are lost to erosion shall not be replanted.

THIRTY-THREE: In the event that levee or bank erosion injurious to any adopted or future plan of flood control occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

THIRTY-FOUR: The landscaping, appurtenances, and maintenance practices shall conform to standards contained in Section 131 of the Central Valley Flood Protection Board's Regulations.

THIRTY-FIVE: Any vegetative material, living or dead, that interferes with the successful execution, functioning, maintenance, or operation of the adopted or future plan of flood control must be removed by the permittee at permittee's expense upon request by the Central Valley Flood Protection Board, Department of Water Resources, or local maintaining agency. If the permittee does not remove such vegetation or trees upon request, the Central Valley Flood Protection Board reserves the right to remove such at the permittee's expense.

THIRTY-SIX: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

THIRTY-SEVEN: The permittee shall operate and maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of the Department of Water Resources or any other agency responsible for maintenance. Maintenance may include actions to preserve the integrity of the flood control system under emergency conditions. These actions will be taken at the sole expense of the permittee.

THIRTY-EIGHT: If the planted vegetation results in an adverse hydraulic impact, the permittee will provide appropriate mitigation to be approved by the Central Valley Flood Protection Board.

THIRTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

FORTY: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

FORTY-ONE: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

FORTY-TWO: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act

may be required.

FORTY-THREE: The permittee shall be responsible for securing any necessary permits incidental to habitat manipulation and restoration work completed in the flood control project, and will provide any biological surveying, monitoring, and reporting needed to satisfy those permits.

FORTY-FOUR: All conservation easements established within this project area shall be junior to flowage and maintenance easements within the project limits.

FORTY-FIVE: The permittee agrees to incur all costs for compliance with local, State, and Federal permitting and resolve conflicts between any of the terms and conditions that agencies might impose under the laws and regulations it administers and enforces.

FORTY-SIX: This permit shall run with the land and all conditions are binding on permitee's successors and assigns.

Friends of the Tuolumne, Inc.

anadromous@bendbroadband.com
(541) 306-6887

Revegetation Plan for Phase II Bobcat Flat

Phase II restoration at Bobcat Flat is scheduled to begin during the summer of 2011. The restoration will correct historic landform disturbances (primarily dredger gold mining) that have left the site in an unnatural state. The overall project will address floodplain vegetation deficiencies and in-channel fishery improvements. Both vegetation concerns and fishery actions will be accomplished by excavating the floodplain surface. Surface elevations will be lowered to be compatible with plant establishment and the materials excavated will be used for in-stream fishery habitat improvement.

The gold dredging process inverted the soil strata so that fine soil materials that were once surface material and the cobble and gravels that were once far below have been reversed. Now the cobbles and gravels are on top and the fine soil materials are on the bottom. Although many of the cobbles were removed in the late 1960's, the ground surface elevation was left abnormally high. Due to these circumstances, natural plant growth has been disrupted or disallowed.

Re-vegetating the site is scheduled to begin during the spring of 2012 and will establish vegetation that existed prior to the disturbances.

The re-vegetation plan will plant native plant species on the newly lowered surfaces according to the Central Valley Flood Control Board standards. The site is divided into three revegetation types; 1) Mixed willow and cottonwood planting, 2) un-planted natural recruitment areas, and 3) Nursery stock planting areas. (See riparian planting overview Sheet R-1 to Sheet R-4.)

1) Mixed willow and cottonwood patches: Native mixed willow and cottonwood cuttings will be planted in areas excavated to a design floodplain elevation. These areas are designed to be within 4 feet of summer ground water to insure that cuttings can be placed directly into water. Cuttings will be placed in rows 20 feet apart and parallel to overbank flow. Cuttings within the rows will be spaced at least 15 feet on center. Up to 1,100 cuttings will be placed in this manner.

Trees:	Approximate Number
Arroyo Willow (*Salix lasiolepis*)	220
Goodings willow (*Salix gooddingii* var. *variabilis*)	220
Fremont Cottonwood (*Populus fremontii*)	220
Red Willow (*Salix laevigata*)	220
Yellow Tree Willow (*Salix lucida* var. *lasiandra*)	220

2) Un-planted natural recruitment areas are designated to provide control data of what natural recruitment takes place when remnant scraped dredger surface is lowered to an elevation that begins to inundate around the 1.5- to 2-year flood event; a natural floodplain elevation.

3) Nursery stock planting areas: One of the byproducts of coarse sediment sieving is the production of fine sediment (coarse sediment less than 1/8 inch). These fines will be spread on constructed floodplain surfaces that are depositional and less likely to see high velocities and shear stress that would wash them back into the main channel. Placed fines provide the planting medium necessary for nursery stock plants to establishment and growth. Without fines nursery stock planting areas would remain too rocky for successful growth.

Herbaceous and potted nursery stock:	
Bush Lupine (*Lupinus latifolius)*	50
Coffee Berry (*Rhamnus californica*)	50
Coyote Bush (*Baccharis pilularis*)	50
Mugwort *(Artemesia douglasiana*)	300
California Nettle *(Urtica californica*)	50
California Wild Rose (*Rosa californica*)	50
Ash (*Fraxinus Latifolia*)	50
Rush (*Juncus effuses; J. balticus)*	*200*
Sedge (Carex barbarae)	*100*
Creeping Wild Rye (Leymus triticoides)	*200*

Invasive Management On Restored Bobcat Flat

There are two invasive plant species at the site: star thistle and water hyacinth. No other invasive plants are known to exist on the site.

The site has been heavily infested with star thistle for years. Restoration in 2005-2006 was nearly identical in design and implementation to the plans for this phase of restoration. Following the 2005-2006 star thistle did not re-establish in

the restored area, nor did any other invasive, due to the fact that the surfaces were lowered.

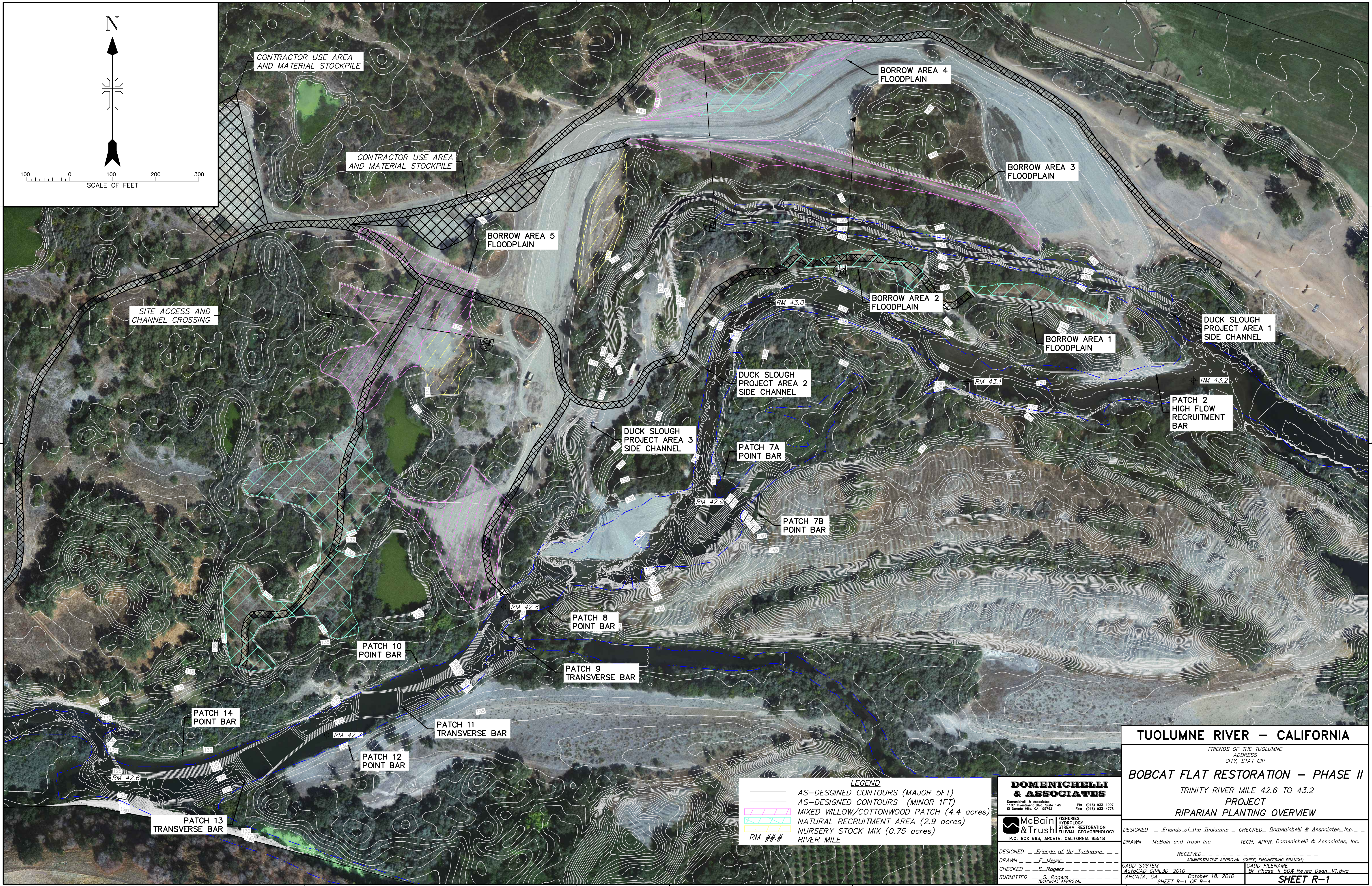
The lowered surfaces periodically experience inundation now and are generally a more moist habitat than it was previously. Star thistle typically does not colonize areas that have moisture. This site will be relatively moist like the previous restoration.

Additionally, as the riparian plantings mature, the shade produced by the tree canopies will eliminate intense sun exposure star thistle requires.

Between the natural ground moisture in a lowered surface elevation, periodic inundation, and tree canopy shade, star thistle will not present any concern.

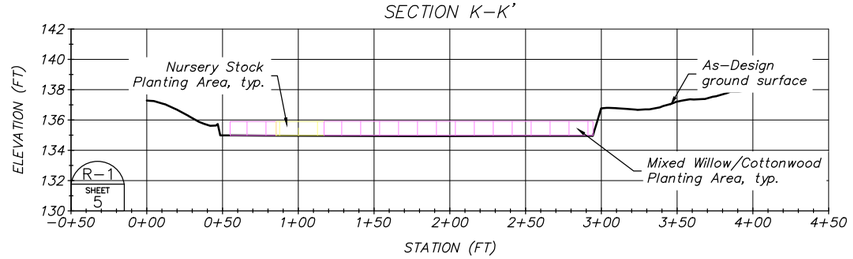
Water hyacinth is a typical non-native species throughout the entire lower Tuolumne River and the San Joaquin River. This project will not create a worsening of the situation and should provide improvement by re-connecting the isolated Duck Slough component of this project to the main river channel. Periodic high flows will disrupt colonization and proliferation on the site.

ATTACMENT B: Exhibit A - Approved Planting Plans

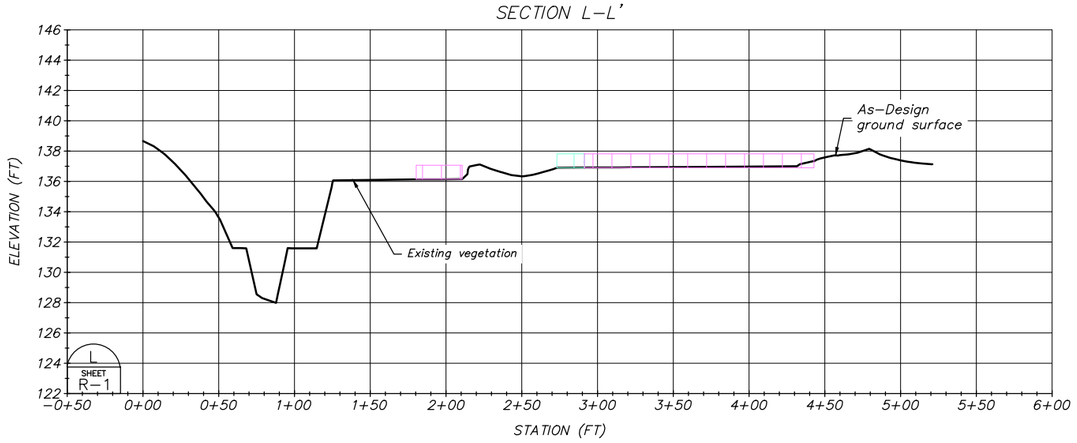

N
100 0 100 200 300
SCALE OF FEET
CONTRACTOR USE AREA AND MATERIAL STOCKPILE
CONTRACTOR USE AREA AND MATERIAL STOCKPILE
SITE ACCESS AND CHANNEL CROSSING
BORROW AREA 5 FLOODPLAIN
BORROW AREA 4 FLOODPLAIN
BORROW AREA 3 FLOODPLAIN
BORROW AREA 2 FLOODPLAIN
BORROW AREA 1 FLOODPLAIN
DUCK SLOUGH PROJECT AREA 1 SIDE CHANNEL
DUCK SLOUGH PROJECT AREA 2 SIDE CHANNEL
DUCK SLOUGH PROJECT AREA 3 SIDE CHANNEL
PATCH 2 HIGH FLOW RECRUITMENT BAR
PATCH 7A POINT BAR
PATCH 7B POINT BAR
PATCH 8 POINT BAR
PATCH 9 TRANSVERSE BAR
PATCH 10 POINT BAR
PATCH 11 TRANSVERSE BAR
PATCH 12 POINT BAR
PATCH 13 TRANSVERSE BAR
PATCH 14 POINT BAR
RM 43.0
RM 43.1
RM 43.2
RM 42.9
RM 42.8
RM 42.7
RM 42.6
LEGEND
AS-DESGINED CONTOURS (MAJOR 5FT)
AS-DESGINED CONTOURS (MINOR 1FT)
MIXED WILLOW/COTTONWOOD PATCH (4.4 acres)
NATURAL RECRUITMENT AREA (2.9 acres)
NURSERY STOCK MIX (0.75 acres)
RM ##.# RIVER MILE
DOMENICHELLI & ASSOCIATES
Domenichelli & Associates
1107 Investment Blvd. Suite 145
El Dorado Hills, CA 95762
Ph: (916) 933-1997
Fax: (916) 933-4778
McBain & Trush
FISHERIES
HYDROLOGY
STREAM RESTORATION
FLUVIAL GEOMORPHOLOGY
P.O. BOX 663, ARCATA, CALIFORNIA 95518
DESIGNED Friends of the Tuolumne
DRAWN F. Meyer
CHECKED S. Rogers
SUBMITTED S. Rogers
TECHNICAL APPROVAL
TUOLUMNE RIVER - CALIFORNIA
FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP
BOBCAT FLAT RESTORATION - PHASE II
TRINITY RIVER MILE 42.6 TO 43.2
PROJECT
RIPARIAN PLANTING OVERVIEW
DESIGNED Friends of the Tuolumne CHECKED Domenichelli & Associates, Inc.
DRAWN McBain and Trush Inc. TECH. APPR. Domenichelli & Associates, Inc.
RECEIVED
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)
CADD SYSTEM
AutoCAD CIVIL3D-2010
ARCATA, CA October 18, 2010
SHEET R-1 OF R-4
CADD FILENAME
BF Phase-II 50% Reveg Dsgn V1.dwg
SHEET R-1

DATE AND TIME PLOTTED
10/18/2010 1:48 PM
PLOTTED BY
F. MEYER

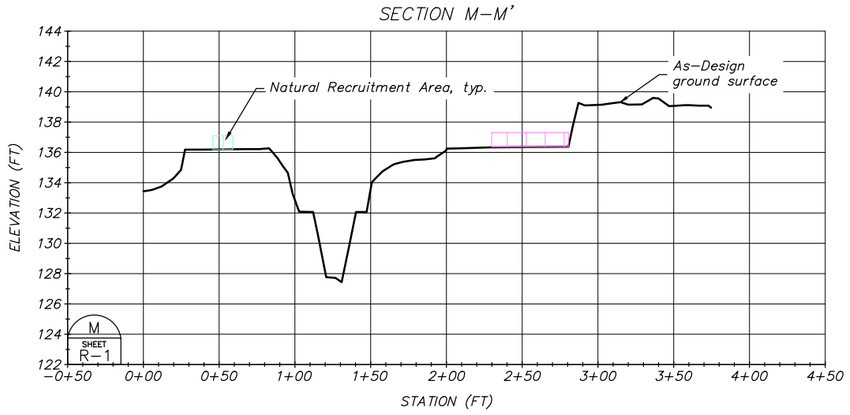
SECTION K–K'



SECTION L–L'



SECTION M–M'



DATE AND TIME PLOTTED
10/18/2010 1:45 PM
PLOTED BY
F. MEYER

ATTACMENT B: Exhibit A - Approved Planting Plans

DOMENICHELLI & ASSOCIATES
Domenichelli & Associates
1107 Investment Blvd, Suite 145
El Dorado Hills, CA 95762
Phn (916) 933–1997
Fax (916) 933–4778

McBain & Trush | FISHERIES HYDROLOGY STREAM RESTORATION FLUVIAL GEOMORPHOLOGY
P.O. BOX 663, ARCATA, CALIFORNIA 95518

DESIGNED _ Friends of the Tuolumne _ _
DRAWN _ _ _ F. Meyer _ _ _ _ _ _ _ _ _
CHECKED _ _ S. Rogers _ _ _ _ _ _ _ _
SUBMITTED _ S. Rogers _ _ _ _ _ _ _ _
TECHNICAL APPROVAL

TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

SECTION

RIPARIAN PLANTING SECTIONS

DESIGNED _ Friends of the Tuolumne _ CHECKED_ Domenichelli & Associates, Inc. _ _
DRAWN _ McBain and Trush Inc. _ _ _ _TECH. APPR. Domenichelli & Associates, Inc. _
RECEIVED_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

CADD SYSTEM: AutoCAD CIVIL 3D–2010
CADD FILENAME: BF Phase–II 50% Revea Dsgn V1.dwg
ARCATA, CA October 18, 2010
SHEET R–2 OF R–4

SHEET R–2

MIXED WILLOW / FREMONT COTTONWOOD PATCH PLANTING ROW DETAIL

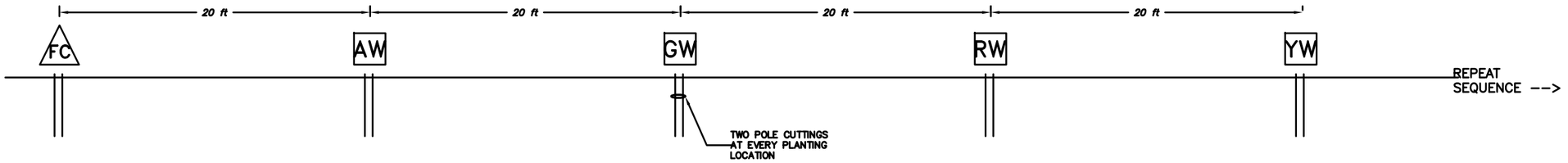
Planting spacing on row: 1 planting consisting of 2 poles every 20 ft on center. Pole cuttings will be provided by an implemented by a contractor designated by Friends of the Tuolumne. Riparian cuttings will be planted in the following ratios:

- *20% FC – Fremont cottonwood (cutting – blue end)*
- *20% AW – Arroyo willow (cutting – green end)*
- *20% GW – Goodings willow (cutting – orange end)*
- *20% RW – Red willow (cutting – red end)*
- *20% YW – Yellow tree willow (cutting – yellow end)*

DETAIL SCALE

4 0 4 8 12 16 20

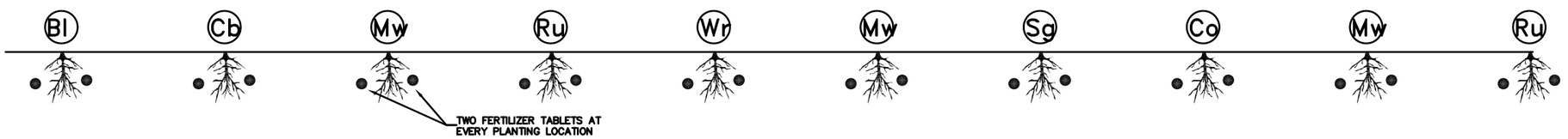
SCALE OF FEET



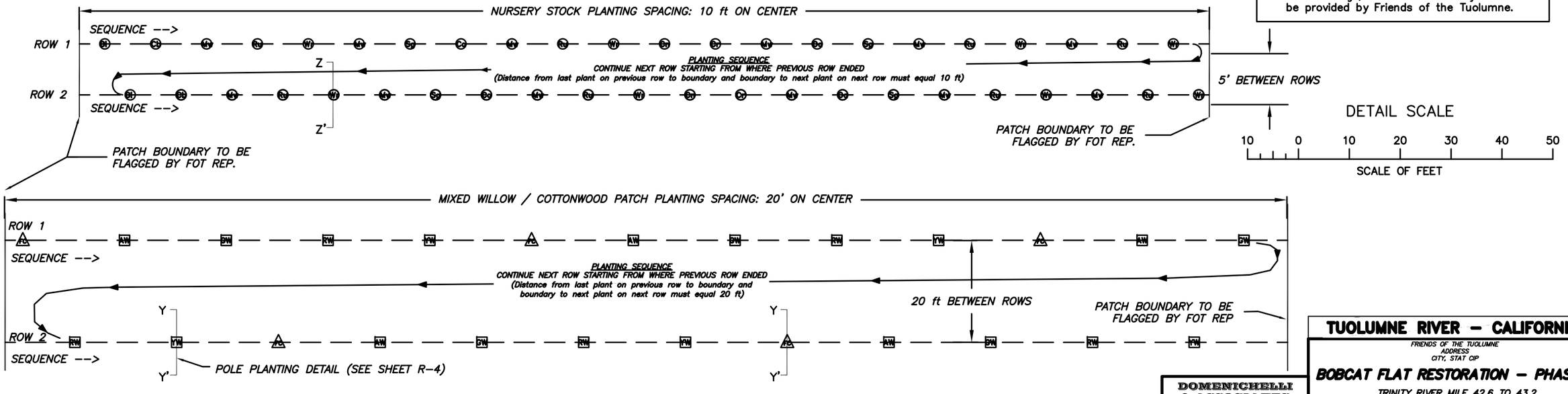
NURSERY STOCK PATCH PLANTING ROW DETAIL

Planting spacing on row: 1 planting consisting of 1 container every 10 ft on center. Nursery stock rows will be planted in the following ratios:

- *4.5% Bl – Bush Lupine*
- *4.5% Cb – Coffee Berry*
- *4.5% Co – Coyote Bush*
- *28% Mw – Mugwort*
- *4.5% Cn – California Nettle*
- *4.5% Cr – California Wild Rose*
- *4.5% Oa – Oregon Ash*
- *18% Ru – Rush*
- *9% Sg – Sedge*
- *18% Wr – Creeping Wild Rye*



EXAMPLE OF ROW DETAIL PLAN VIEW



DETAIL SCALE

10 0 10 20 30 40 50

SCALE OF FEET

Plant material specifications
1. Pole cuttings, acorns and nursery stock will be provided by Friends of the Tuolumne.

DATE AND TIME PLOTTED
10/18/2010 1:26 PM
PLOTTED BY
F. MEYER

DOMENICHELLI & ASSOCIATES
Domenichelli & Associates
1107 Investment Blvd. Suite 145
El Dorado Hills, CA 95762
Ph: (916) 933-1997
Fax: (916) 933-4776

McBain & Trush
FISHERIES HYDROLOGY STREAM RESTORATION FLUVIAL GEOMORPHOLOGY
P.O. BOX 663, ARCATA, CALIFORNIA 95518

DESIGNED Friends of the Tuolumne
DRAWN F. Meyer
CHECKED S. Rogers
SUBMITTED S. Rogers
TECHNICAL APPROVAL

TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT ZIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

PROJECT
RIPARIAN PLANTING ROW DETAIL

DESIGNED Friends of the Tuolumne CHECKED Domenichelli & Associates, Inc.
DRAWN McBain and Trush Inc. TECH. APPR. Domenichelli & Associates, Inc.
RECEIVED
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

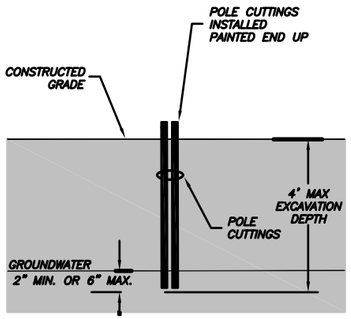
CADD SYSTEM AutoCAD Civil 3D–2010
ARCATA, CA October 18, 2010
SHEET R–3 OF R–4

CADD FILENAME RF Phase–II 50% Revsn Details.dwg

SHEET R–3

ATTACHMENT B: Exhibit A - Approved Planting Plans

CUTTING PLANTING DETAIL
SECTION Y–Y'

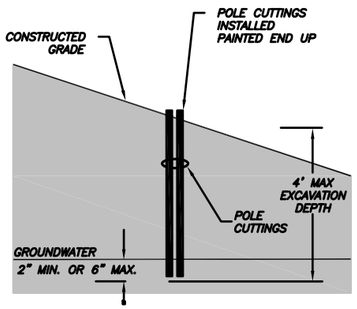


POLE PLANTING DETAIL (BENCH)

NOTES

1. Excavate 6 inches below groundwater, or to maximum depth of 4 feet, whichever is less.
2. Install two pole cuttings at each planting location.
3. Maximum allowable insertion angle of pole cuttings is 15 degrees.
4. Painted end of pole cuttings must be oriented up and must extend a minimum of 2 inches above grade (4 inches maximum).
5. Backfill around pole cuttings with sediment removed from hole and tamp firmly to remove air pockets.
6. Upon completion of backfill, regrade area around planting as necessary so that finished surface is no more than 1 foot above grade.

SECTION Y–Y'

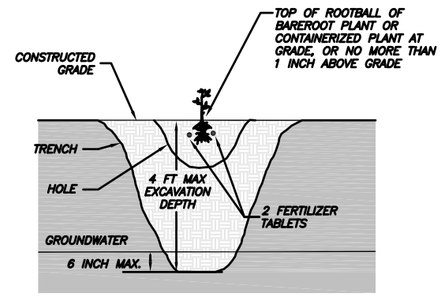


POLE PLANTING DETAIL (SLOPE)

NOTES

1. Excavate 6 inches below groundwater, or to maximum depth of 4 feet, whichever is less.
2. Install two pole cuttings at each planting location.
3. Maximum allowable insertion angle of pole cuttings is 15 degrees.
4. Painted end of pole cuttings must be oriented up and must extend a minimum of 2 inches above grade (4 inches maximum).
5. Backfill around pole cuttings with sediment removed from hole and tamp firmly to remove air pockets.
6. Upon completion of backfill, regrade area around planting as necessary so that finished surface is no more than 1 foot above grade.

NURSERY STOCK PLANTING DETAIL
SECTION Z–Z'

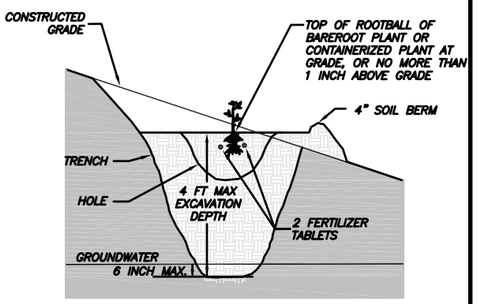


NURSERY STOCK PLANTING DETAIL (BENCH)

NOTES:

1a. If planted using a trench, excavate to be no more than 6 inches below groundwater, or to a maximum depth of 4 feet, whichever is less.
1b. If planted using an individual hole, dig a hole into the existing ground that is twice the size of the rootball of the bareroot plant or containerized plant, break apart soil clods and remove rocks and weeds.
2. Place one bareroot or containerized plant in hole with top of rootball at grade, or no more than 1 inch above grade.
3. Backfill around rootball with sediment removed from hole and tamp firmly to remove air pockets.
4. Install two fertilizer tables within 1 foot of rootball and no more than 1 foot below grade
5. Upon completion of backfill, regrade area around planting as necessary so that finished surface is no more than 6 inches above grade.

SECTION Z–Z'



NURSERY STOCK PLANTING DETAIL (SLOPE)

NOTES

1a. If planted using a trench, excavate to be no more than 6 inches below groundwater, or to a maximum depth of 4 feet, whichever is less.
1b. If planted using an individual hole, dig a hole into the existing ground that is twice the size of the rootball of the bareroot plant or containerized plant, break apart soil clods and remove rocks and weeds.
2. Place one bareroot or containerized plant in hole with top of rootball at grade, or no more than 1 inch above grade.
3. Backfill around rootball with sediment removed from hole and tamp firmly to remove air pockets.
4. Install two fertilizer tables within 1 foot of rootball and no more than 1 foot below grade
5. Upon completion of backfill, regrade area around planting as necessary so that finished surface is no more than 6 inches above grade.

DETAIL SCALE

2 0 2 4 6 8

SCALE OF FEET

LEGEND

EXISTING GROUND
EXCAVATED/BACKFILLED MATERIAL

DATE AND TIME PLOTTED
10/18/2010 11:24 PM
PLOTTED BY
F. MEYER

TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

PROJECT

RIPARIAN PLANTING DETAIL

DOMENICHELLI & ASSOCIATES
Domenichelli & Associates
1107 Investment Blvd. Suite 145
El Dorado Hills, CA 95762
Ph: (916) 933-1997
Fax: (916) 933-1776

McBain & Trush
FISHERIES HYDROLOGY STREAM RESTORATION FLUVIAL GEOMORPHOLOGY
P.O. BOX 663, ARCATA, CALIFORNIA 95518

DESIGNED Friends of the Tuolumne
DRAWN F. Meyer
CHECKED S. Rogers
SUBMITTED S. Rogers
TECHNICAL APPROVAL

DESIGNED _ Friends of the Tuolumne _ CHECKED_ Domenichelli & Associates, Inc. _ _
DRAWN _ McBain and Trush Inc. _ _ _ _TECH. APPR. Domenichelli & Associates, Inc. _
RECEIVED_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

CADD SYSTEM: AutoCAD CIVIL 3D–2010
CADD FILENAME: DF Phase–II 50% Revsn Details.dwg
ARCATA, CA October 18, 2010
SHEET R–4 OF R–4

SHEET R–4

ATTACHMENT B: Exhibit A – Approved Planting Plans

STATE OF CALIFORNIA
THE RESOURCES AGENCY
CENTRAL VALLEY FLOOD PROTECTION BOARD

RESOLUTION NO. 10-47

FINDINGS AND DECISION AUTHORIZING ISSUANCE OF
ENCROACHMENT PERMIT NO. 18601
FRIENDS OF THE TUOLUMNE, INC.

WHEREAS, Friends of the Tuolumne, Inc. proposes to restore the Bobcat Flat West site to improve wildlife and aquatic habitat within the Tuolumne River and Duck Slough; and

WHEREAS, Friends of the Tuolumne, Inc. submitted Application 18601 to the Central Valley Flood Protection Board (Board) on May 12, 2010. The application proposes to restore channel function and connectivity of the Tuolumne River and Duck Slough by excavating and depositing material from surfaces adjacent to the channels. The restored floodplain will be reforested through natural recruitment and riparian plantings; and

WHEREAS, a letter of no comment from the U.S. Army Corps of Engineers for application 18601 was received on August 16, 2010, which determined the proposed work does not affect a federally constructed project; and

WHEREAS, the California Department of Fish and Game as lead agency under the California Environmental Quality Act, Public Resources Code sections 21000 et seq. ("CEQA") prepared and reviewed an Initial Study, Mitigated Negative Declaration (IS/MND) and Mitigation Monitoring Plan ("MMP") (State Clearinghouse No.: 2010072048, July 2010) for the Bobcat Flat West Restoration Phase II, River Mile 43 project (incorporated herein by reference and available at the office of the Central Valley Flood Protection Board or California Department of Fish and Game); and

WHEREAS, on August 30, 2010, the California Department of Fish and Game made CEQA Findings, approved the IS/MND, mitigation measures, a MMP and filed a Notice of Determination; and

WHEREAS, the Central Valley Flood Protection Board has conducted a hearing and has reviewed the application, the Report of its staff, the documents and correspondence in its file, and the environmental documents prepared by Friends of the Tuolumne, Inc.;

NOW, THEREFORE, BE IT RESOLVED THAT,

Findings of Fact

1. The Central Valley Flood Protection Board hereby adopts as findings the facts set forth in the Staff Report.

2. The Board has reviewed the Attachments listed in the Staff Report.

CEQA Findings

3. The Central Valley Flood Protection Board, as a responsible agency, has independently reviewed the analysis in the IS/MND and MMP, and the findings prepared by the lead agency California Department of Fish and Game, and has reached its own conclusions. The Board finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's Mitigation Reporting Plan and address impacts to air, biological resources, cultural resources, geology and soil resources and hydrology.

4. The Central Valley Flood Protection Board, after consideration of the IS/MND and MMP, and California Department of Fish and Game findings, adopts the project description, analysis and Findings which are relevant to activities authorized by issuance of final encroachment Permit No. 18601 Friends of the Tuolumne, Inc., Bobcat Flat West Restoration Phase II, River Mile 43 Project.

5. **Custodian of Record.** The custodian of the CEQA record for the Board is its Executive Officer, Jay Punia, at the Central Valley Flood Protection Board Offices at 3310 El Camino Avenue, Room 151, Sacramento, California 95821.

Findings pursuant to Water Code section 8610.5

6. **Evidence Admitted into the Record**. The Board has considered all the evidence presented in this matter, including the original and updated applications, past and present Staff Reports and attachments. The Board has also considered all letters and other correspondence received by the Board and in the Board's files related to this matter.

   The custodian of the file is Executive Officer Jay Punia at the Central Valley Flood Protection Board.

7. **Best Available Science**. In making its findings, the Central Valley Flood Protection Board has used the best available science relating to the issues presented by all parties.

8. **Effects on State Plan of Flood Control**. This project does not have significant impacts on the State Plan of Flood Control, as the project does not impair the structural or hydraulic functions of the system.

9. **Effects of Reasonable Projected Future Events**. There are no other foreseeable projected future events that would impact this project.

Other Findings/Conclusions regarding Issuance of the Permit

10. This resolution shall constitute the written decision of the Central Valley Flood Protection Board in the matter of Permit No. 18601.

Approval of Encroachment Permit No. 18601

11. Based on the foregoing, the Central Valley Flood Protection Board hereby approves the Bobcat Flat West Restoration Phase II, River Mile 43 Project and approves issuance of Encroachment Permit No. 18601 in substantially the form provided in the Staff Report.

12. The Central Valley Flood Protection Board directs the Executive Officer to take the necessary actions to prepare and execute the permit and related documents and file a Notice of Determination under the California Environmental Quality Act for the Friends of the Tuolumne, Inc., Bobcat Flat West Restoration Phase II, River Mile 43 Project.

PASSED AND ADOPTED by vote of the Board on _____, 2010.

_____
Benjamin F. Carter
President

_____
Butch Hodgkins
Secretary

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section (18601)

AUG 16 2010

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Mr. Punia:

We have reviewed a permit application by Friends of the Tuolumne, Inc. (application number 18601). This project includes placing approximately 16,000 cubic yards of coarse sediment along approximately 1,800 linear feet and excavating approximately 41,000 cubic yards within the Designated Floodway of the Tuolumne River. The project also includes placing approximately 2,500 cubic yards of coarse sediment along approximately 1,500 linear feet of Duck Slough. The project is located approximately 10 miles east of Waterford in Stanislaus County, at 37.6312°N 120.5610°W NAD83, Stanislaus County, California.

The District Engineer has no comments or recommendations regarding flood control because the proposed work does not affect a federally constructed project.

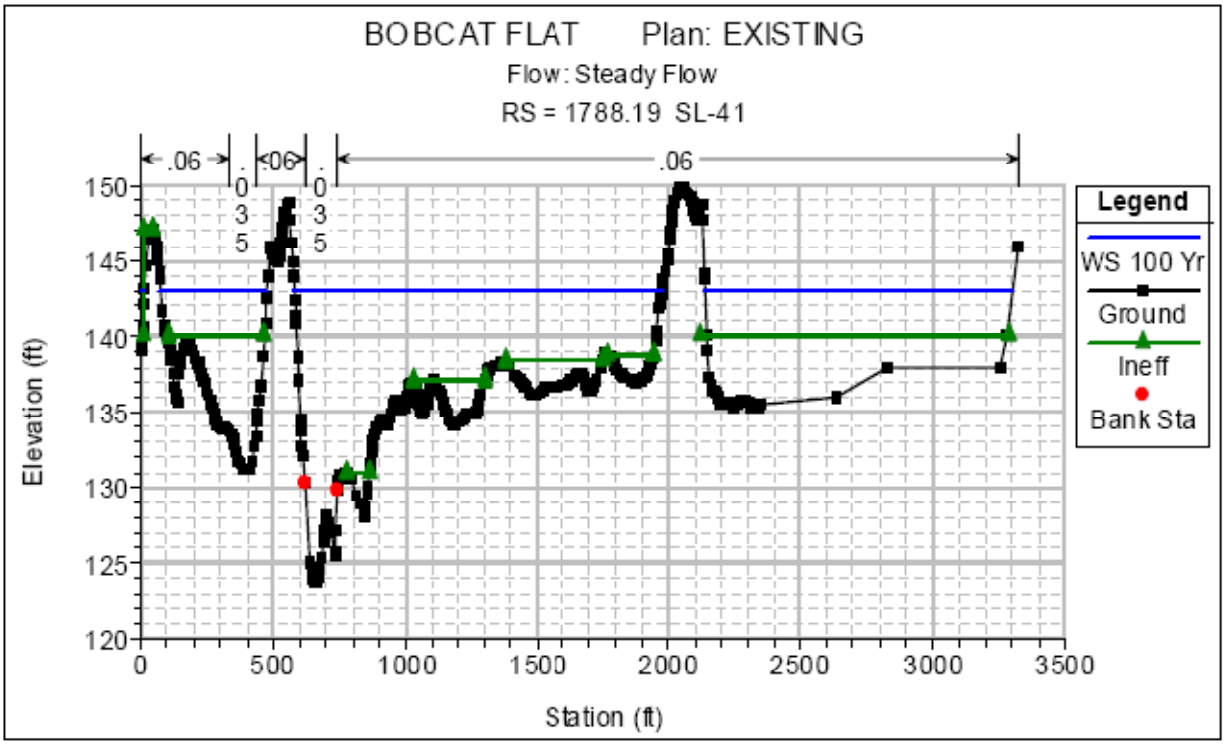
A section 10 and/or Section 404 permit application (SPK-2002-602) is in process for this work.

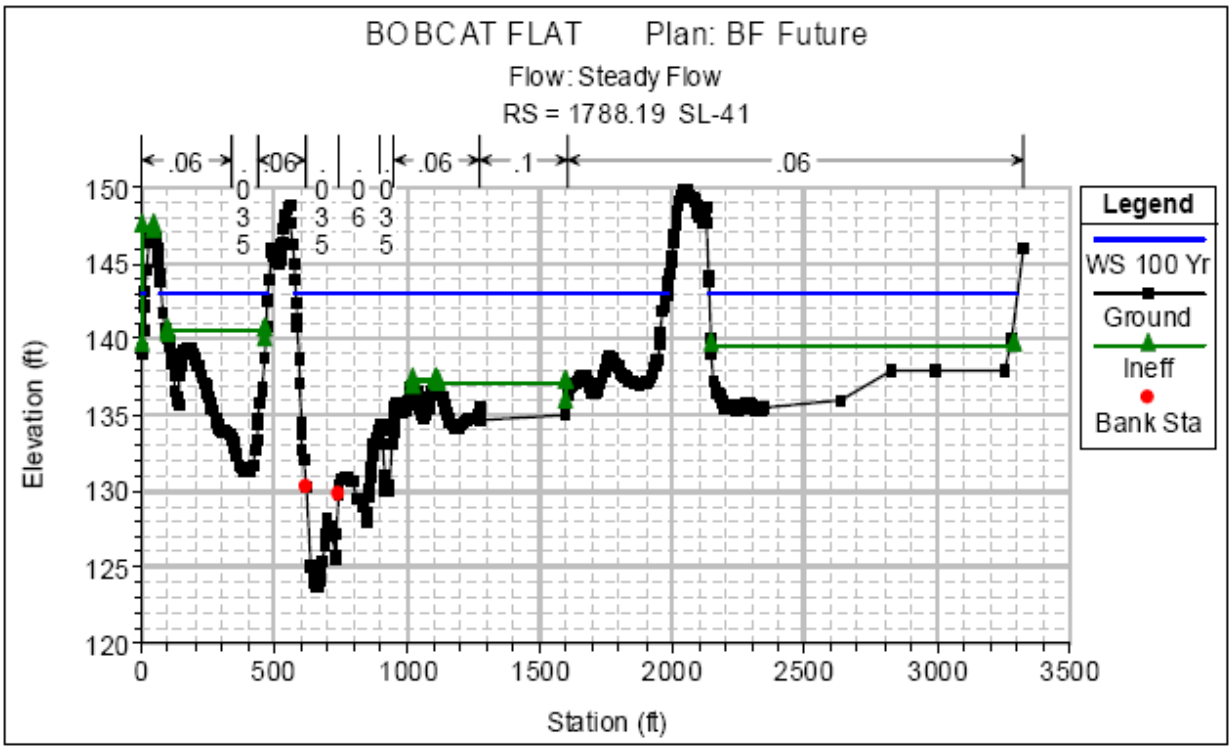
A copy of this letter is being furnished to the acting chief, Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, CA 95821.

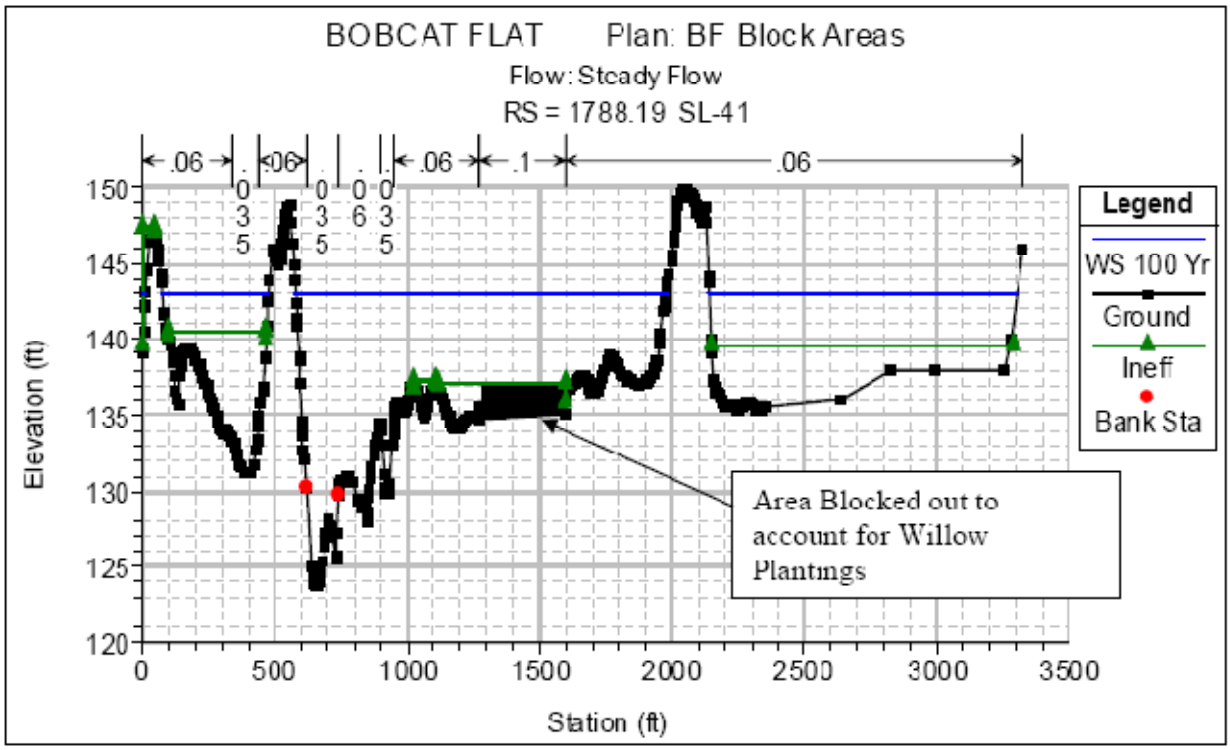
Sincerely,

Meegan G. Nagy, P.E.
Chief, Flood Protection and Navigation Section

HEC-RAS Hydraulic Profiles (100-year)






BOBCAT FLAT Plan: BF Block Areas
Flow: Steady Flow
RS = 1788.19 SL-41
.06
.06
.06
.1
.06
0 3 5
0 3 5
0 0 6 3 5
Legend
WS 100 Yr
Ground
Ineff
Bank Sta
Area Blocked out to account for Willow Plantings
Elevation (ft)
Station (ft)
150
145
140
135
130
125
120
0
500
1000
1500
2000
2500
3000
3500

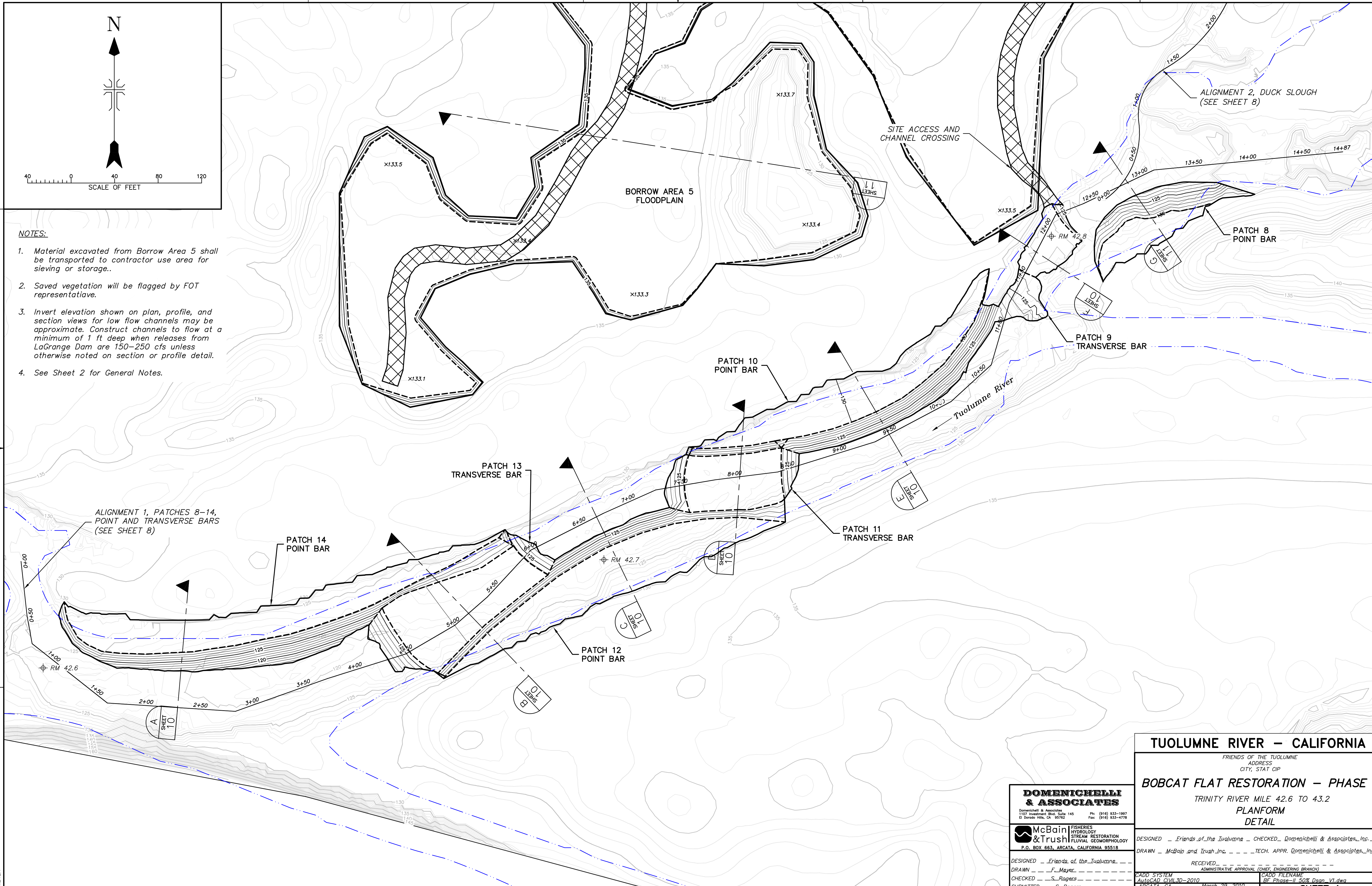
WSE Changes

River Station	Existing WSE (ft)	BF Future WSE Difference (ft)	BF Block Areas WSE Difference (ft)
40+02	144.84	0	0.06
38+23.04	144.07	0	0.08
35+77.56	144.26	0.01	0.09
34+92.13	144.28	0	0.08
34+26.15	144.21	-0.01	0.07
32+64.92	143.85	0.01	0.07
30+38.25	143.57	-0.02	-0.01
29+12.8	143.51	0	0.02
27+50.14	143.46	-0.02	0
25+75.49	143.37	-0.02	-0.01
23+97.46	143.24	-0.01	0
22+06.92	143.16	-0.01	0
20+94.15	143.11	-0.01	0.01
19+95.28	143.08	-0.01	0.01
18+97.54	142.98	0.01	0.02
17+88.19	142.98	0	0.01
16+04.88	142.94	0	0.01
14+22.6	142.87	-0.01	-0.01
13+76.43	142.86	-0.01	-0.01
12+42.83	142.82	0.01	0.01
10+86.76	142.76	0	0
9+21.81	142.69	0	0
8+33.05	142.65	0	0
7+07.03	142.58	0	0
5+45.53	142.45	-0.01	-0.01
3+95.31	142.41	-0.03	-0.03
2+80.24	142.42	-0.05	-0.05
2+13.03	142.34	-0.02	-0.02
1+18.42	142.23	-0.01	-0.01
0	142.12	-0.02	-0.02

Velocity Changes

River Station	Existing Velocity Difference (ft/sec)	BF Future Velocity Difference (ft/sec)	BF Block Areas Velocity Difference (ft/sec)
40+02	11.54	0	-0.08
38+23.04	11.91	0	-0.12
35+77.56	7.67	0	-0.1
34+92.13	7.45	0	-0.08
34+26.15	7.52	0.2	0.1
32+64.92	8.86	0.05	0.13
30+38.25	8.31	0.2	0.53
29+12.8	7.42	-0.05	0.06
27+50.14	6.95	0.08	0.24
25+75.49	5.77	0.15	0.3
23+97.46	6.23	-0.07	0.1
22+06.92	5.13	-0.06	-0.02
20+94.15	5.11	-0.19	-0.13
19+95.28	5.27	-0.14	-0.09
18+97.54	5.1	-0.33	-0.29
17+88.19	5.02	-0.25	-0.14
16+04.88	4.54	-0.17	-0.12
14+22.6	4.88	-0.04	0.18
13+76.43	4.49	0.11	0.18
12+42.83	4.41	-0.27	-0.22
10+86.76	4.76	-0.28	-0.18
9+21.81	5.12	-0.28	-0.25
8+33.05	5.41	-0.36	-0.25
7+07.03	5.58	-0.32	-0.32
5+45.53	6.16	-0.24	-0.24
3+95.31	6.47	-0.14	-0.14
2+80.24	6.32	-0.46	-0.46
2+13.03	6.48	-0.02	-0.02
1+18.42	6.85	-0.06	-0.06
0	7.01	-0.01	-0.01

ATTACHMENT F - Overall Plan and Profiles



NOTES:

1. Material excavated from Borrow Area 5 shall be transported to contractor use area for sieving or storage..
2. Saved vegetation will be flagged by FOT representatiave.
3. Invert elevation shown on plan, profile, and section views for low flow channels may be approximate. Construct channels to flow at a minimum of 1 ft deep when releases from LaGrange Dam are 150–250 cfs unless otherwise noted on section or profile detail.
4. See Sheet 2 for General Notes.

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TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2
PLANFORM
DETAIL

DOMENICHELLI & ASSOCIATES
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McBain & Trush
FISHERIES
HYDROLOGY
STREAM RESTORATION
FLUVIAL GEOMORPHOLOGY
P.O. BOX 663, ARCATA, CALIFORNIA 95518

DESIGNED Friends of the Tuolumne
DRAWN F. Meyer
CHECKED S. Rogers
SUBMITTED S. Rogers
TECHNICAL APPROVAL

DESIGNED Friends of the Tuolumne CHECKED Domenichelli & Associates, Inc.
DRAWN McBain and Trush Inc. TECH. APPR. Domenichelli & Associates, Inc.
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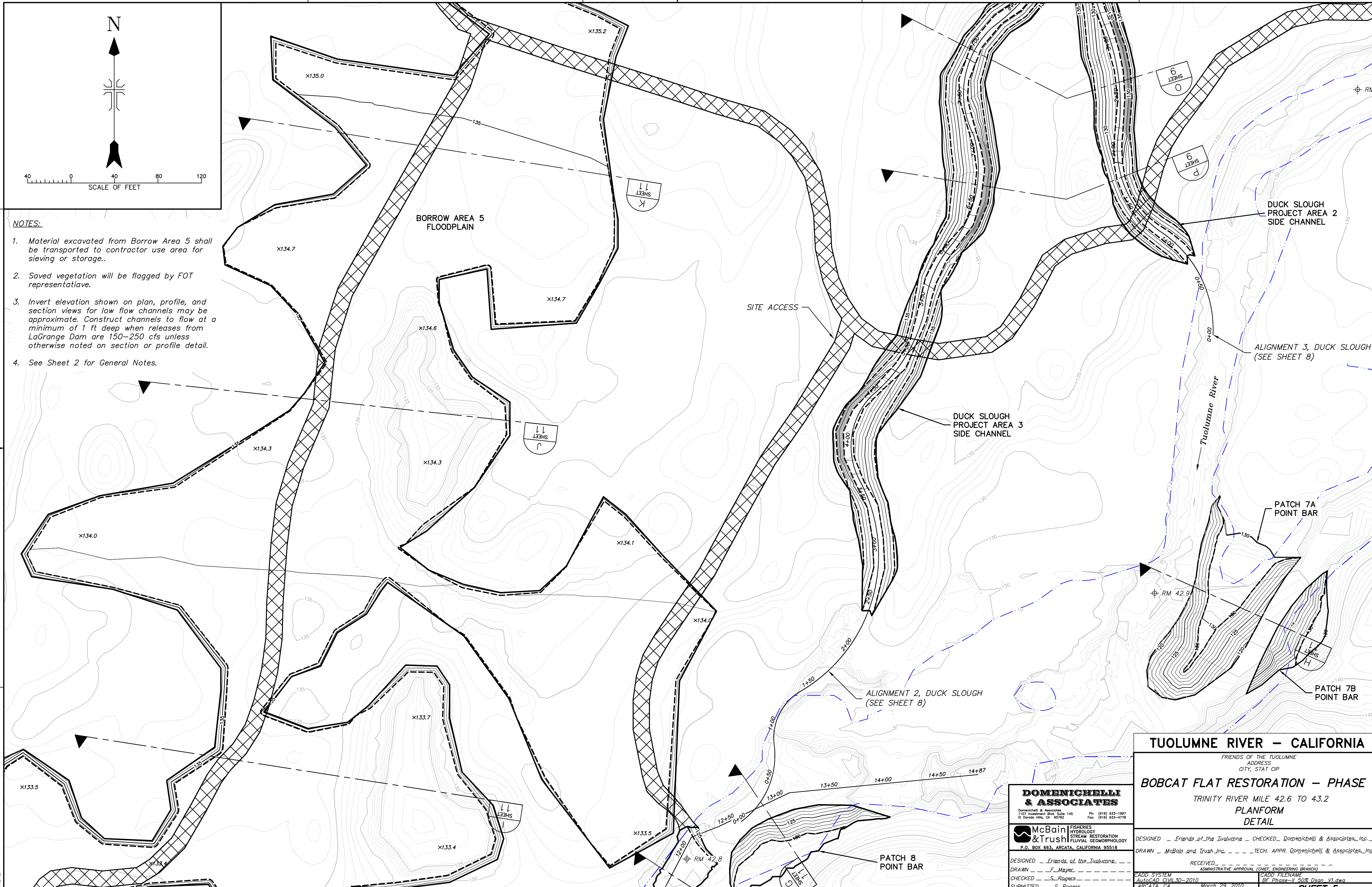
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

CADD SYSTEM AutoCAD CIVIL3D–2010	CADD FILENAME BF Phase–II 50% Dsgn_V1.dwg
ARCATA, CA March 29, 2010 SHEET 4 OF 12	SHEET 4

ATTACHMENT F - Overall Plan and Profiles



NOTES:

1. *Material excavated from Borrow Area 5 shall be transported to contractor use area for sieving or storage..*
2. *Saved vegetation will be flagged by FOT representatiave.*
3. *Invert elevation shown on plan, profile, and section views for low flow channels may be approximate. Construct channels to flow at a minimum of 1 ft deep when releases from LaGrange Dam are 150–250 cfs unless otherwise noted on section or profile detail.*
4. *See Sheet 2 for General Notes.*

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TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
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CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2
PLANFORM
DETAIL

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CADD SYSTEM AutoCAD CIVIL3D–2010	CADD FILENAME BF Phase-II 50% Dsgn_V1.dwg
ARCATA, CA March 29, 2010 SHEET 5 OF 12	SHEET 5

N

40 0 40 80 120
SCALE OF FEET

NOTES:

1. Material excavated from Borrow Area 5 shall be transported to contractor use area for sieving or storage..
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4. See Sheet 2 for General Notes.

SITE ACCESS

CONTRACTOR USE AREA

BORROW AREA 5 FLOODPLAIN

BORROW AREA 4 FLOODPLAIN

BORROW AREA 3 FLOODPLAIN

BORROW AREA 2 FLOODPLAIN

ALIGNMENT 2, DUCK SLOUGH (SEE SHEET 8)

ALIGNMENT 3, DUCK SLOUGH (SEE SHEET 9)

DUCK SLOUGH PROJECT AREA 3 SIDE CHANNEL

DUCK SLOUGH PROJECT AREA 1 SIDE CHANNEL

DUCK SLOUGH PROJECT AREA 2 SIDE CHANNEL

SHEET 11 K

SHEET 12 L

SHEET 12 M

SHEET 10 6

SHEET 12 P

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TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

PLANFORM
DETAIL

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DRAWN _ _ _ F_Meyer _ _ _ _ _ _ _ _ _ _
CHECKED _ _ S_Rogers _ _ _ _ _ _ _ _ _ _
SUBMITTED _ S_Rogers _ _ _ _ _ _ _ _ _ _
TECHNICAL APPROVAL

CADD SYSTEM
AutoCAD CIVIL3D–2010
ARCATA, CA October 12, 2009
SHEET 6 OF 12

CADD FILENAME
BF Phase–II 50% Dsgn V1.dwg

SHEET 6

BORROW AREA 3
FLOODPLAIN

SITE ACCESS

ALIGNMENT 3, DUCK SLOUGH
(SEE SHEET 9)

BORROW AREA 2
FLOODPLAIN

DUCK SLOUGH
PROJECT AREA 2
SIDE CHANNEL

DUCK SLOUGH
PROJECT AREA 1
SIDE CHANNEL

BORROW AREA 1
FLOODPLAIN

RM 43.0

Tuolumne River

RM 43.1

RM 43.2

PATCH 2
HIGH FLOW
RECRUITMENT
BAR

ALIGNMENT 3, DUCK SLOUGH
(SEE SHEET 9)

N

40 0 40 80 120
SCALE OF FEET

NOTES:

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4. See Sheet 2 for General Notes.

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DESIGNED _ Friends of the Tuolumne _
DRAWN _ F. Meyer _
CHECKED _ S. Rogers _
SUBMITTED _ S. Rogers _
TECHNICAL APPROVAL

TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT ZIP

BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

PLANFORM
DETAIL

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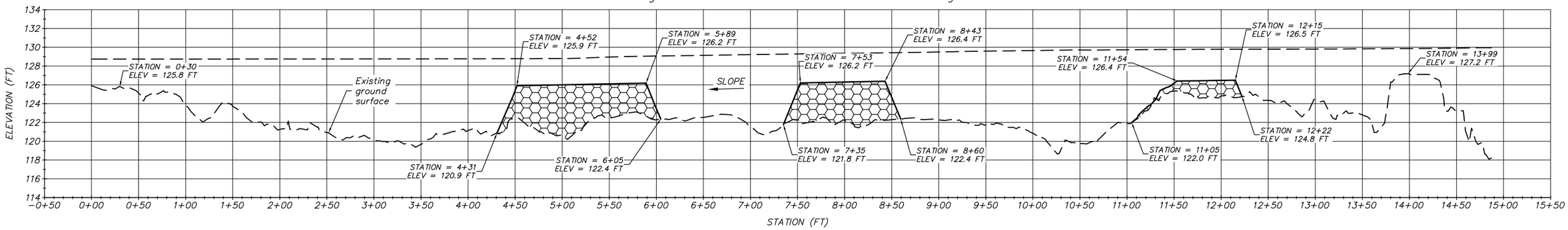
RECEIVED_____
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

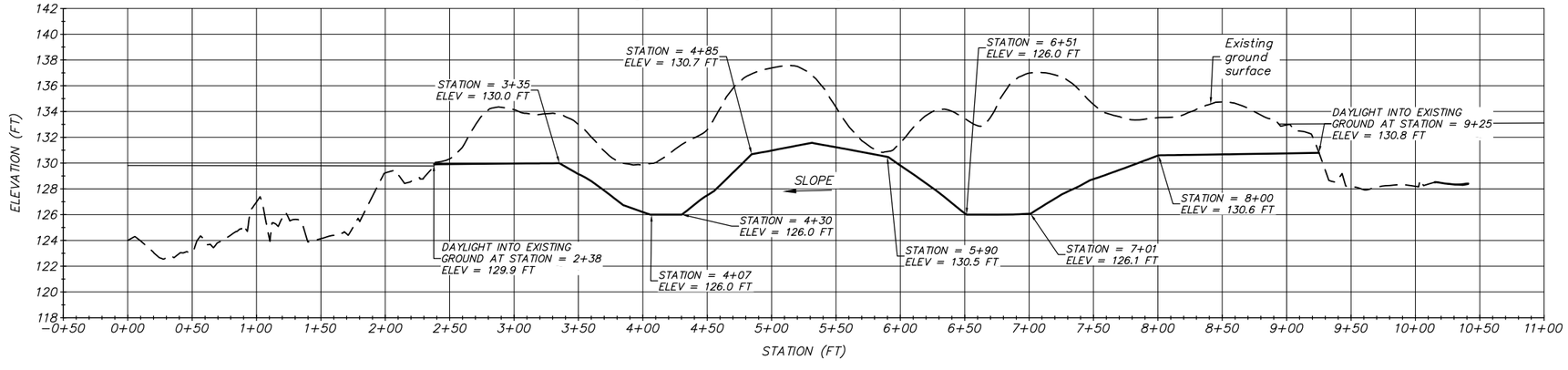
CADD SYSTEM: AutoCAD CIVIL 30–2010
CADD FILENAME: RF Phase–II 50% Dsgn_V1.dwg
ARCATA, CA March 29, 2010
SHEET 7 OF 12
SHEET 7

ATTACHMENT F - Overall Plan and Profiles

Alignment 1 – Profile of Patches 9–14 30% Design



Alignment 2 – Duck Slough Project Area 3



NOTES:

1. Invert elevation shown on plan, profile, and section views for low flow channels may be approximate. Construct channels to flow at a minimum of 1 ft deep when releases from LaGrange Dam are 150–250 cfs unless otherwise noted on section or profile detail.
2. Water depth in constructed pools may exceed 4 ft deep when releases from LaGrange Dam are 150–250 cfs.
3. See Sheet 2 for general notes.

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3/29/2010 10:18 AM
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F. MEYER

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DESIGNED _ Friends of the Tuolumne _
DRAWN _ F. Meyer _
CHECKED _ S. Rogers _
SUBMITTED _ S. Rogers _ TECHNICAL APPROVAL

TUOLUMNE RIVER – CALIFORNIA

FRIENDS OF THE TUOLUMNE
ADDRESS
CITY, STAT CIP

BOBCAT FLAT RESTORATION – PHASE II

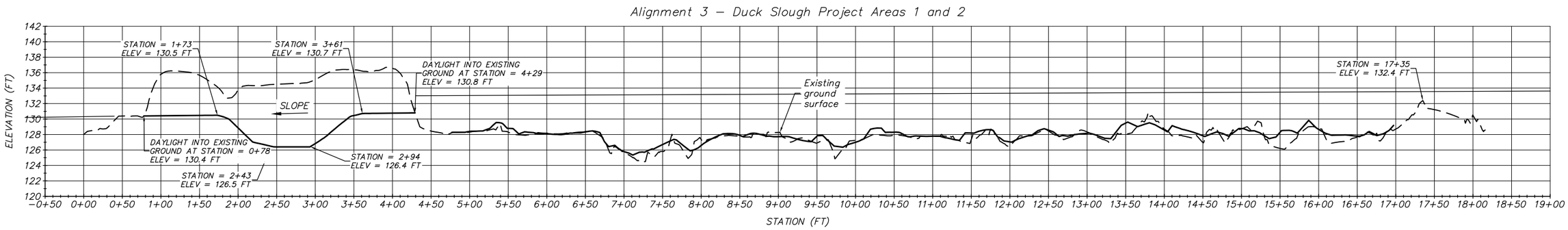
TRINITY RIVER MILE 42.6 TO 43.2

LONGITUDIANL PROFILE
DETAIL

DESIGNED _ Friends of the Tuolumne _ CHECKED_ Domenichelli & Asspciates, Inc. _ _
DRAWN _ McBain and Trush Inc. _ _ _ _TECH. APPR. Domenichelli & Asspciates, Inc. _
RECEIVED_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

CADD SYSTEM: AutoCAD CIVIL3D–2010
CADD FILENAME: BF Phase–II 50% Dsgn V1.dwg
ARCATA, CA March 29, 2010
SHEET 8 OF 12
SHEET 8

ATTACHMENT F - Overall Plan and Profiles



NOTES:

1. Invert elevation shown on plan, profile, and section views for low flow channels may be approximate. Construct channels to flow at a minimum of 1 ft deep when releases from LaGrange Dam are 150–250 cfs unless otherwise noted on section or profile detail.
2. Water depth in constructed pools may exceed 4 ft deep when releases from LaGrange Dam are 150–250 cfs.
3. Section detail sheets provide guidelines for finished grade. FOT representative will work with contractor to refine side slopes and final grading within channel and floodplain project areas.
4. Riffle control elevations shown on plans may not be exceeded.
5. See Sheet 2 for general notes.

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SUBMITTED _ _S. Rogers _ _ _ _ _ _ _ _
TECHNICAL APPROVAL

TUOLUMNE RIVER – CALIFORNIA

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BOBCAT FLAT RESTORATION – PHASE II

TRINITY RIVER MILE 42.6 TO 43.2

LONGITUDIANL PROFILE

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ADMINISTRATIVE APPROVAL (CHIEF, ENGINEERING BRANCH)

CADD SYSTEM: AutoCAD CIVIL 3D–2010
CADD FILENAME: BF Phase–II 50% Dsgn V1.dwg
ARCATA, CA March 29, 2010
SHEET 9 OF 12
SHEET 9

ATTACHMENT F - Overall Plan and Profiles